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A periodic mixing mechanism in stratified turbulent Taylor-Couette flow ROSALIND OGLETHORPE, C.P. CAULFIELD, BP Institute & DAMTP, University of Cambridge, ANDREW W. WOODS, BP Institute, University of Cambridge — We present results from a series of laboratory experiments to study the mixing mechanism in two-layer, stratified turbulent Taylor-Couette flow. We focus on the case of strong stratification, where the density difference $\Delta\rho$ is sufficiently high that the vertical buoyancy flux across the interface is constant (as found by Woods *et al.* (2010)*JFM***663** and Oglethorpe *et al.* (2013)*JFM***721**). We vary the radius, R_1, surface roughness and rotation rate, Ω, of the inner cylinder, relative to the stationary outer cylinder, of radius R_2. The measurements of the density field near the interface, using both conductivity probe data and visualization techniques, show a periodic signal which is associated with the mixing. We find that the period of the signal is given by $T \propto (2\pi/\Omega)(R_2/R_1)$. We also find that the mean angular momentum in the bulk of the flow is constant, and depends on the surface roughness of the inner cylinder. We use these results to present an interpretation of the mixing mechanism related to the periodic signal.

Rosalind Oglethorpe
BP Institute & DAMTP, University of Cambridge

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